1. Conditional Probability
2. Multiplication theorem and independent events
3. law of total probability and Baye's theorem
4. Random variable and its probability distribution, mean and Variance of random variable.
5. Repeated independent (Bernoullian) trials and Binomial distribution.

Random Experiment- An Experiment is called random experiment if satisfy the following two condition

1) It has more than one possible outcome
2) It is not possible to predict the outcome in advance.

Sample space / Outcome:- Possible result of a random experiment is called its outcome & set of all possible outcome is called sample space

Events- Any subset E of a sample space is called an Event.

Probability:- Probability theory quantify the chance of occurrence or ~~non occurrence~~ or non occurrence of events in a random experiment.

P(E)= No of outcomes favorable to E / Total possible outcomes No of outcomes favorable to E

=n(E)/n(s)

Two Coins

$S=\{HH, TT, HT, TH\}$

$E=\{HH\}$

1 Coins = $S=\{H, T\}$

$S=\{H\}\ \{T\}$

$$P(E)=\frac{n(E)}{n(S)}$$

Experiment :-

Tossing a Coin.

$S = \{H, T\}$ $\quad n(S) = 2$

E_1 (Event) Head appears $E_1 = \{H\}$ $\quad n(E_1) = 1$

$$P(E) = \frac{1}{2}$$

Experiment :-2

Tossing two coins.

$S = \{HH, TT, HT, TH\}$ $\quad n(S) = 4$

Event :-1 Head appears on first

$E = \{HH, HT\}$ $\quad n(E) = 2$

$$P(E) = \frac{2}{4} = \frac{1}{2}$$

Event-2 Tail appears on both

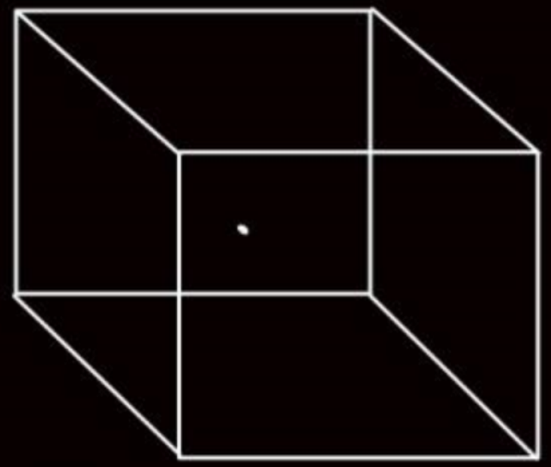
$E_2 = \{TT\}$ $\quad n(E_2) = 1$

$$P(E) = \frac{1}{4}$$

Throwing a dice

6

$S = \{1, 2, 3, 4, 5, 6\}$ $n(S) = 6$



Event E_1 → Every Even No

$E_1 = \{2, 4, 6\}$ $n(E_1) = 3$

$$P(E) = \frac{3}{6} = \frac{1}{2}$$

Throwing two dice

$S = \{(1,1)(1,2)(1,3)(1,4)(1,5),(1,6),(2,1),(2,2),(2,3),(2,4)$
$(2,5),(2,6),(3,1) - \text{-----} (6,6)\}$

$n(S) = 36$

Event :- Sum is even. H·W

Algebra of Event & its probability.

Complementary Event :-

A' → denote.

$$P(A') = 1 - P(A)$$

$S = \{HH, TT, HT, TH\}$

Event :- both head on to top $E = \{HH\}$ $P(E) = \frac{1}{4}$

$E' = \{HT, TT, TH\}$ $P(E') = \frac{3}{4}$

$$\frac{3}{4} = 1 - \frac{1}{4} = \frac{3}{4}$$

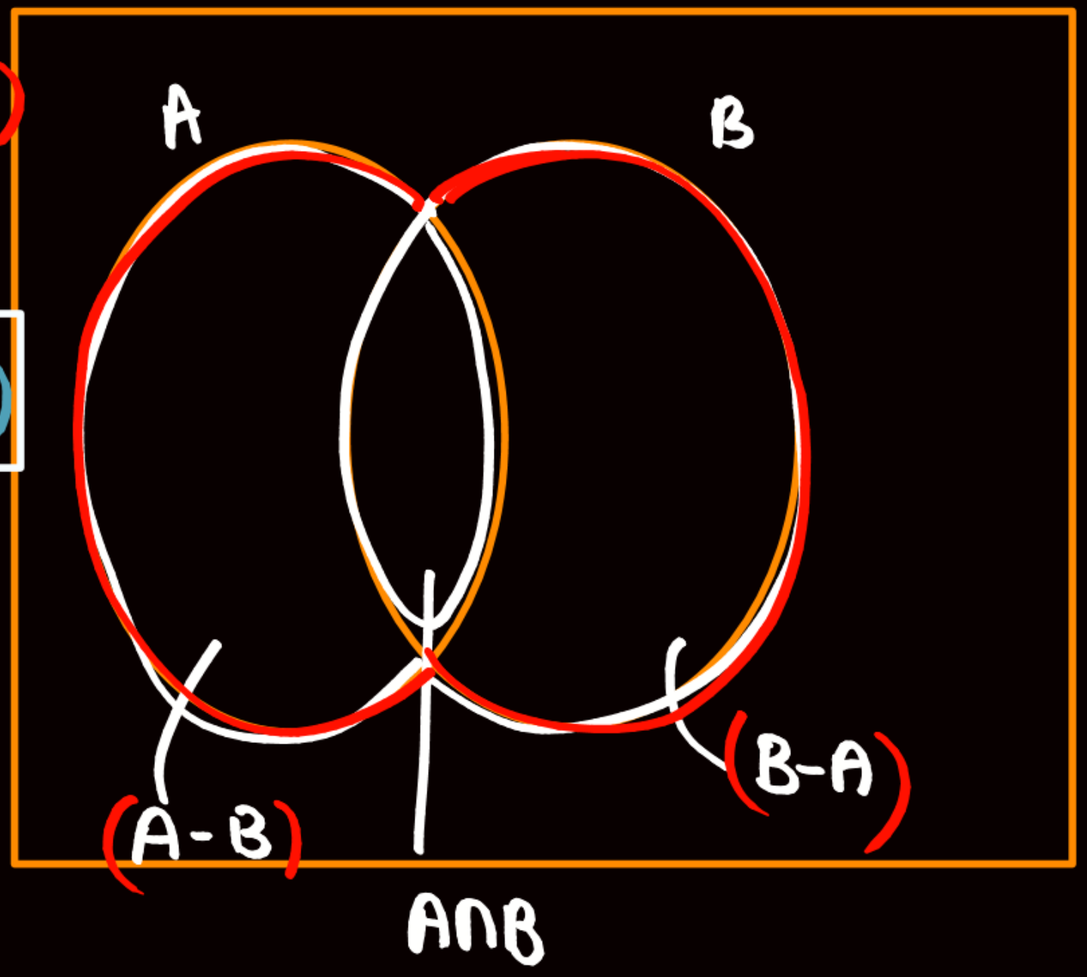
Event A or B $(A \cup B)$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

OR

$$P(A \cup B) = P(A - B) + P(B - A) + P(A \cap B)$$



Event A and B $(A \cap B)$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\boxed{P(A \cap B) = P(A) + P(B) - P(A \cup B)}$$

Event A but not B or B but not A

Event A but not B

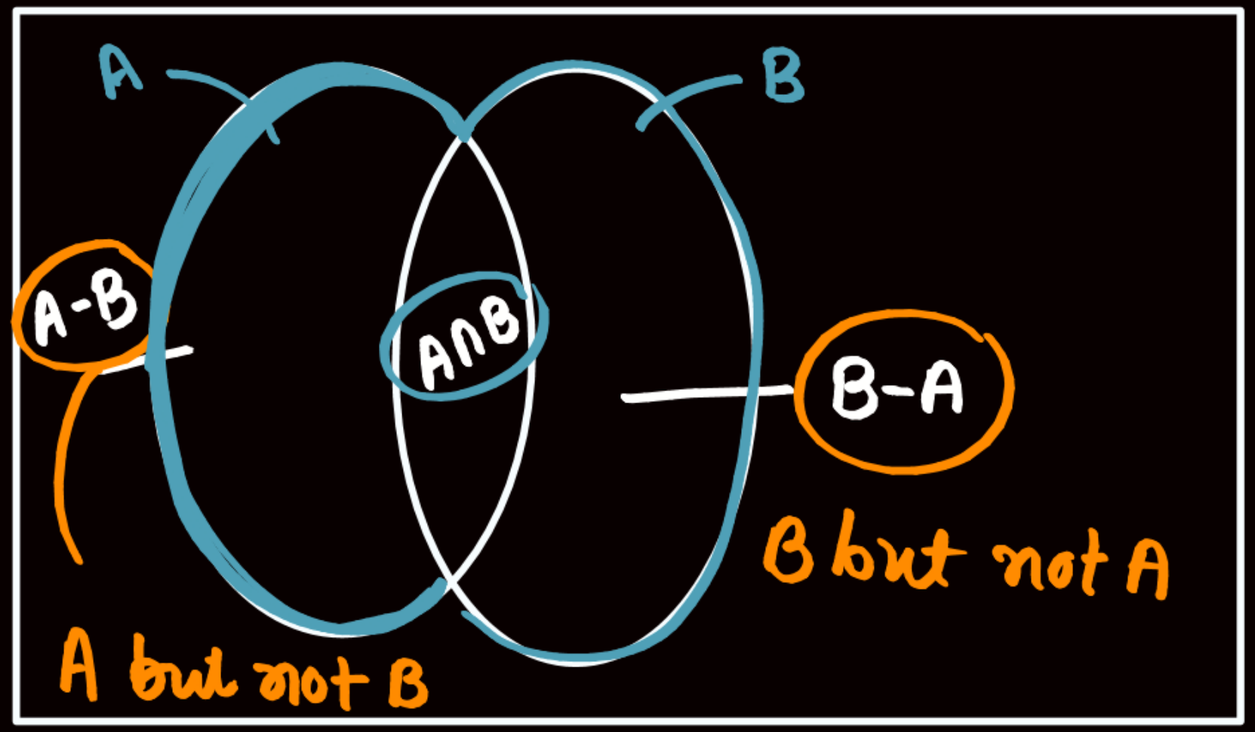
$(A-B)$

$$P(A-B) = P(A) - P(A \cap B)$$

$$P(B-A) = P(B) - P(A \cap B)$$

OR

$$P(B-A) = P(A' \cap B) = P(B) - P(A \cap B)$$



Mutually Exclusive Event:- Two events are mutually exclusive if the occusence of any one of then excludes the occurrence of the other events.

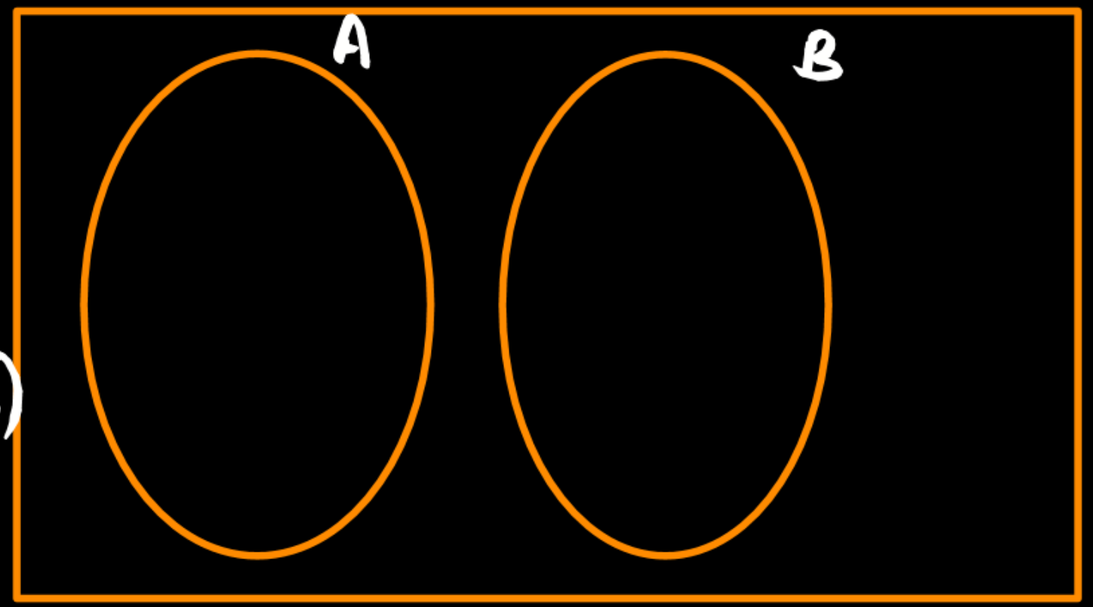
$$A \cap B = \phi$$

$$n(A \cap B) = 0$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cup B) = P(A) + P(B) - 0$$

$$P(A \cup B) = P(A) + P(B)$$



$$n(A \cap B) = 0$$

1.Given P(A)= $\frac{3}{5}$ AND P(B)=$\frac{1}{5}$, P(B)=$\frac{1}{5}$, find P(A or B),given that A and B are mutually exclusive events.

2. The probability of an event A occurring is 0.5 and of 0.3.if A nad B are mutually exclusive events then find the probability of neither A not B occurring.

3.If A and B are mutually exclusive events, P(A)=0.35 and P(B) =0.45 then find

i) P(A') ii) P(B') iii) P(AUB) iv) P(A∩B) v) P(A∩B')

4.If E and F are event such that P(E)=$\frac{1}{4}$, P(F)=$\frac{1}{2}$ and P(E and F) =$\frac{1}{8}$, Find

i) $P(E\ or\ F)$ ii) P(not E and not F)

5.A and B are events such that P(A)=0.42, P(B)=0.48 and P(A and B)=0.16 Determine

i) P(notA) ii) P(not B) iii) P(A or B)

6.A and B are two mutually exclusive events of an experiment. If P(not A)=0.65 , P(A∪B)=0.65 and P(B)=p Find the value of p.

7.E and F are two events associated with a random experiment for which P(E)=0.60 P(E or F)=0.85 p(E and F)=0.42 Find P(F)

8. If A,B and C are mutually exclusive and exhaustive events and it is known that P(AUB)=0.63 calculate P(C)

9. A,B,C are three mutually exclusive and exhaustive events associated with a random experiment.Find P(A)=it Being given that P(B)=$\frac{3}{2}$ P(A) and P(C)=$\frac{1}{2}$ **P**(B).

10. A die is thrown once. Let A be the event that the number obtained is greater than 3 and B be the event that the number obtained is less than 5 then find P(AUB).

11. A and B are two candidates seeking admission in an engineering College. The Probability that A is selected is 0.5 and the probability that both are selected is atmost 0.3. is it possible that the probability of B getting selected is 0.7?

12. The probability of an event a occurring is $\frac{2}{3}$ and the probability of event B not occurring is $\frac{5}{9}$. If the Probability of getting success in atleast one of the two events is $\frac{4}{5}$ what is the probability of success in both the events?

13. Tickets numbered from 1 to 20 are mixed up together and then a ticket is drawn at random. What is the probability that the ticket has a number which is multiple of 3 or 7?

14. The Probability that a student will pass the final examination in both English and hindi is 0.5 and the probability of passing neither is 0.1. If the probability o passing the English examination is 0.75 what is the probability pf passing the hindi examination?

15. In a class of 60 students 30 opted for mathematics 32 opted for Biology and 24 opted for both Mathematics and biology.If one of these students is selected at random , find the probability that:

i) the student opted for Mathematics or Biology.

Ii) the student has opted neither Mathematics nor Biology.

Iii) the student has opted Mathematics but not Biology.